effect, has little or no claim on water from the upper Flathead above Kerr Dam. This includes the water contained in Whitefish Lake.

5. The Author has calculated the volume of Whitefish Lake at approximately 368,656 acre-feet (See Table Q-1: Calculation of Whitefish Lake Volume, Appendix Q). Using the accepted DNRC volume estimating method yields an approximate volume of 371,850 acre-feet. The estimates agree reasonably well. The seasonal water level fluctuation of Whitefish Lake is approximately 8'. Consequently, the dead storage volume of the lake is only 13,400 ac-ft (3,350 surface acres x 8' depth / 2) less than the "full pool" volume of approximately 370,000 ac-ft. The Applicant's requested volume of 1.25 acre-feet represents 0.00034% (34/100,000 of 1%) of the dead storage of Whitefish Lake.
6. For all intents and purposes Avista has no claim to water above Kerr Dam. This would include Whitefish Lake. No calls on the source by either Avista or the various operators of Kerr Dam have been placed over the eighty plus years that their water rights have been in place. Consequently, water is legally available for appropriation by the Applicant.

Adverse Affect: *The applicant argues the issuance of this request would have negligible impact on prior appropriators. He indicates the water legally appropriated from Whitefish Lake totals approximately 1.7% of the volume available in the lake, and 75% of the flow available from Swift Creek. Again, the applicant did not discuss any known or potential adverse affects to senior users downstream of the lake.*

In the Matter of Application For Beneficial Water Use Permit No. 76N-30010429 by Thompson River Lumber Co. (2006) found that a new appropriation causing a reduction of water flowing in the Clark Fork River would be an adverse impact to the Avista Corporation's Noxon Reservoir water rights when the Clark Fork River is flowing less than 50,000 cfs, regardless whether or no that reduction in flow could be measured at the Noxon Dam power generating Turbines. The proposed appropriation is for a consumptive use on a source of water tributary to the Clark Fork River.

In the above-mentioned TRL decision, the Hearing Examiners states that: "The evidence in the record is uncontroverted that a reduction of 250 gpm above Avista's point of diversion is a loss of 250 gpm to Avista's water right of 50,000 cfs at times when the flow of the Clark Fork River is below 50,000 cfs."

The resulting inference of this statement is that **any** reduction in flow rate above Avista's point of diversion is a loss to Avista' water right and, consequently, represents an adverse affect.

Refutation of this statement is based on the following:

Attached you will find Appendix A, which represents a graph I prepared from data I retrieved from various on-line sources including the DNRC Water Rights Query System. A full list of the sources of the data is included at the end of this narrative. I am also attaching an electronic copy of the spreadsheet that contains the data and, from which the graph was developed. It is a semi-log graph with the X-axis representing the years from 1911 to 2005 and the Y-axis representing varying units, depending on which data line is read.

There are four data lines represented on the graph:

1. The uppermost data line represents a cumulative total of the populations of the counties within the borders of the Clark Fork River Basin – Flathead, Lake, Sanders, Mineral, Missoula, Powell, Ravalli, Granite, Deer Lodge and Silver Bow with data points at the decade marks. Units for this line are number of people.
2. The next lower data line represents an annual average of the Mean Monthly Flow Rate of the Clark Fork River over a period of 95 years, beginning in 1911 and ending with 1998. Despite the fact that data is available for the years 1999 through 2005, it was excluded, based on the following "Legal water availability is determined by analysis of non-drought

periods". See Appendix G: "*In The Matter Of Application For Beneficial Water Use Permit No. 41H-1154870000 By PC Development – Final Order*", page 5 of 11. Data points on this line are plotted annually. Units for this line are cubic feet per second.

3. The third line down represents a cumulative total of all surface water rights within the counties and sub-basins within the main Clark Fork Basin. Data points are plotted on the decade for this line. Units for this line are Unique Water Rights filed with the DNRC.
4. The lowermost line represents an annual average of monthly precipitation for the western portion of Montana. Data points for this line are plotted annually. Its units are in inches of precipitation.

Also included with each data line is a "Trend Line" created by the spreadsheet. Each trend line is calculated based on a linear equation and represents the time-based trend in the data line. As shown in the graph, the Population Line and the Water Right Number line are trending upward, while the Precipitation trend line is flat. The Clark Fork Flow Rate trend line displays a slight upward slope.

The data lines and trend lines tell an interesting story of the effects (or lack thereof) of population growth (development) and water use on the flow rate of the Clark Fork River above Noxon Dam. The population of the counties within the boundaries of the Clark Fork River Basin has increase by over 225% in the 95 years shown in the graph. The number of water rights has grown exponentially over the same period of time, increasing by over 9,800%. Taking into account the inevitable, small annual fluctuations in precipitation, overall annual precipitation in the Basin has stayed perfectly flat for that 95-year period. And, ignoring the drought years of 1999-2005, the Clark Fork River's average annual flow rate remarkably has shown a slight increase over the 95-year period of the graph. The river's essentially steady flow rate has maintained despite significant increases in population and in water use (as evidenced by the huge number of filed water rights[1]).

Had the Clark Fork River's Flow Rate Trend Line displayed relatively flat slope over perhaps one-quarter to one-half the time frame of the graph, followed by a gradually steepening negative slope as the population and water usage trend lines increased, a direct correlation argument could have been made for adverse effect. This, however, is simply not the case. For at least 95 years, the flow rate of the Clark Fork River has stayed virtually unchanged despite massive increases in water usage in the Basin and no increase in precipitation.

Simply stated, from the data presented there is no direct evidence of cause and effect between population increase, water use, precipitation levels and river flow rate over the period covered.

1. In my research, gathering the data for the graph, I would have liked to have been able to compile the flow rates and volumes associated with the water rights I queried through the DNRC Water Rights Query System. Being able to quantify not only the simple quantity of water rights filed during the period, but also the cumulative flow rates and volumes of all those thousands of water rights would have undoubtedly lent even more weight to the argument that no downstream adverse effect will be felt by any downstream senior appropriator, let alone Avista, by the Applicant's proposed 1 acre-foot appropriation. I was, however, under a time constraint and simply did not have the time that it would have taken to quantify that huge amount of data. Also, the cost to my clients to perform a research project of that scope would have been extremely burdensome and something I couldn't in good conscience subject them to.

   In the months since my original data gathering for this report, Mr. Mark Spratt, Hydrologist and owner of RLK Hydro, Inc., prepared a PowerPoint presentation for a meeting of the Water Policy Interim Committee of the 60th Montana Legislature on September 12, 2007 in Thompson Falls, Montana. In his presentation, he quantified and reported the consumptive use value for the Flathead Sub-Basin I was earlier unable to do. His findings indicate that consumptive uses total 31,200,000 ac-ft/yr. This is more than double the annual contribution component of the Flathead Sub-Basin to the Clark Fork's flow (14,818,240 ac-ft/yr). His conclusion was that, despite this incongruous data, "No decrease, or depletion, is evident in the long-term flow records at Plains." See Appendices C and D "Spratt Slides".

When the data is analyzed, it becomes apparent that, on a regional (as opposed to local) basis, the Clark Fork Basin acts hydraulically as a closed system. In a closed system, the hydraulic equation is fairly simple: Outflow = Inflow – Evapotranspiration. More than likely, this is due at least in part to the vast area the Basin encompasses. At nearly 22,000 square miles, it harbors literally thousands of miles of rivers and streams, thousands of lakes, ponds and reservoirs, as well as several significant subsurface aquifers, all of which are recharged by annual precipitation that totals 22.5 million acre-feet.

In a closed system, the hydrologic cycle is not affected by internal uses. Water at one location is temporarily "borrowed" by a user from the overall water budget of the basin and sometime later returned with no significant loss, to be "re-borrowed" again at a later time by a user at a different location, who then returns it, etc. Sufficient residence time for water within the Basin exists such that, averaged over time, these "temporary" upstream uses are of no consequence to the ultimate, overall downstream outflow. Consequently, despite the data showing 90 years worth of population increase and increasing water demand within the Basin, flow rates on the Lower Clark Fork River have remained steady during that time period.

Because Avista's Noxon Rapids Dam lies at the extreme downstream end of the Basin outflow, the closed nature of the Basin allows all of the upstream uses to occur without measurably impacting the quantity of the outflow. This has been demonstrated as being true by the presentation of the data by me, hydrologist Mark Spratt (Appendices C & D) and State Representative Verdell Jackson (See Appendix N). We all came to the same conclusion – upstream water uses have no impact on river flow rates near the extreme downstream outflow point.

It has been adequately demonstrated that Avista's right to use the flows of the Clark Fork River to generate electricity have not been encroached upon by the relatively small upstream uses that currently exist and, for at least the foreseeable future will not be encroached upon. There may come a day when the demand for water by upstream users begins to impact the "closed system" that constitutes the Clark Fork Basin. But if and when that day will arrive is a matter of pure speculation. Consequently, the Legal Availability of water for Avista and Adverse Affect to its existing water rights, or those of any other downstream appropriator should not be a Criteria issue in determining the validity of the Applicant's Permit.

An Analysis of Avista Water Rights

Legal Aspects of Avista's Water Rights

In a decree issued August 27, 1986, Montana Water Judge Holter confirmed the 1951 and 1959 Avista water rights. Avista obtained the 1974 rights through the Montanan Water Use Act water right permitting process and the associated public notice and administrative review. Judge Holter's 1986 decree is subject to an additional objection period before issuance of a final decree by the Montana Water Court. About 30% of the water rights in the basin, by number, are junior to Avista's 1974 rights.

(Note regarding the Holter decree:
The author hasn't been able to find the testimony or other documentation of Judge Holter's decree from on-line sources. I am certain that the DNRC has records of this decision, but time constraints prevented me from investigating this decree further.)